



PATENT

MS150903.01 /MSFTP162US

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Date: 7-20-04

Himanshu S. Amin

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of:

Applicant(s): Eric Horvitz, *et al.*

Serial No: 09/825,800

Filing Date: April 4, 2001

Examiner: Fred I. Ehichioya

Art Unit: 2172

RECEIVED
JUL 29 2004
Technology Center 2100

Title: TRAINING, INFERENCE AND USER INTERFACE FOR GUIDING THE CACHING OF MEDIA CONTENT ON LOCAL STORES

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Dear Sir:

Applicants submit this brief in triplicate in connection with an appeal of the above-identified patent application. The Commissioner is authorized to deduct \$330.00 for the fee associated with this brief from Deposit Account No. 50-1063 [MSFTP162US].

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I. Real Party in Interest (37 C.F.R. §1.192(c)(1))

The real party in interest in the present appeal is Microsoft Corporation, the assignee of the present application.

II. Related Appeals and Interferences (37 C.F.R. §1.192(c)(2))

Appellants, appellants' legal representative, and/or the assignee of the present application are not aware of any appeals or interferences which will directly affect, or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims (37 C.F.R. §1.192(c)(3))

Claims 1-66 are pending in the application. The rejection of claims 1-66 is being appealed.

IV. Status of Amendments (37 C.F.R. §1.192(c)(4))

No claim amendments have been entered after the Final Office Action.

V. Summary of Invention (37 C.F.R. §1.192(c)(5))

The present invention is a system and method for storing selected information in a local storage system as a function of a user's previous reviewing habits over different time intervals. (*See* page 1, lines 6-7). In particular, the present invention is related to a system and method of caching data guided by a probabilistic predictive model, such as collaborative filtering models and other statistical models that can be used to infer the likelihood of a user's preference for content. (*See* page 3, lines 6-9). Specifically, the invention as claimed has application to multimedia systems for providing storage of a subset of available viewing selections by assigning a value or utility to a selection and retaining selections in the cache depending on the value and size of a selection. (*See* page 3, lines 9-12). The value that is utilized by the claimed invention can be based on the user's viewing habits, the user's viewing habits over a particular time segment, and/or the viewing habits of a group of user's during a particular time segment. (*See* page 3, lines 12-15).

VI. Statement of the Issues (37 C.F.R. §1.192(c)(6))

A. Whether claims 1-9, 14-16, 19, 22-28 and 32-35 are unpatentable under 35 U.S.C. §103(a) over Barrett *et al.* (US 6,005,597) in view of Payton (US 5,790,935).

B. Whether claims 37-56 are unpatentable under 35 U.S.C. §103(a) over Barrett *et al.* in view of Macrae *et al.* (US 6,233,734).

C. Whether claims 10-13, 17-18, 20-21, 29-31 and 36 are unpatentable under 35 U.S.C. §103(a) over Barrett *et al.* in view of Payton and further in view of Macrae *et al.*

D. Whether claims 57-58 and 61 are unpatentable under 35 U.S.C. §103(a) over Macrae *et al.* in view of Barrett *et al.* in view of Payton and further in view of Macrae *et al.*

E. Whether claims 59-60 and 62-65 are unpatentable under 35 U.S.C. §103(a) over Macrae *et al.* in view of Barrett *et al.* and further in view of Payton.

F. Whether claim 66 is unpatentable under 35 U.S.C. §103(a) over Macrae *et al.* in view of Barrett *et al.* in view of Payton and further in view of Macrae *et al.*

VII. Grouping of Claims (37 C.F.R. §1.192(c)(7))

For purposes of this appeal only, the claims are grouped as follows:

Claims 1-66 stand or fall together.

VIII. Argument (37 C.F.R. §1.192(c)(8))

A. **Rejection of Claims 1-9, 14-16, 19, 22-28 and 32-35 Under 35 U.S.C. §103(a)**

Claims 1-9, 14-16, 19, 22-28 and 32-35 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Barrett *et al.* (US 6,005,597) in view of Payton (US 5,790,935). Withdrawal of this rejection is respectfully requested for at least the following reasons.

i. Barrett et al. and Payton alone or in combination fail to teach or suggest all the limitations set forth in independent claim 1.

To reject claims in an application under §103, an examiner must establish a *prima facie* case of obviousness. A *prima facie* case of obviousness is established by a showing of three basic criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) **must teach or suggest all the claim limitations**. See MPEP §706.02(j). The **teaching or suggestion to make the claimed combination** and the reasonable expectation of success **must be found in the prior art and not based on the Applicant's disclosure**. See *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (emphasis added).

Independent claim 1 recites *a database system that logs selections of previously viewed information at a local system received from an information delivery system, and an inference system trained by the log selections of previously viewed information and that assigns values to selections in a recommendation list based on the previously viewed information*. It is apparent that the invention as claimed logs selections of previously viewed information, which is viewed locally, into a database system. The database system resides and comprises local, and/or remote, and/or distributed databases spread across a plurality of servers into which user preferences are logged. Further, the selections of previously viewed information that is logged in the database system are utilized to train the inference system such that the inference system assigns values to selections in a recommendation list based on the previously viewed information.

The Examiner asserts that Barrett *et al.* discloses the applicants' inference system at col. 4, lines 1-4, which states: "The collaborative information is used to augment the viewer profile by inferring program choices based on similarities with other users"; col. 4, lines 60-65, which states: "The second column of the view profile ... includes a number that represents a relative level of interest of the view in the item represented by the key work for a particular row. In the example..., the level of interest is a number between 0 and 1. For example, the level of interest listed for the topic 'Science Fiction'

is 0.678.”; and col. 5, lines 17-18, which states: “In one embodiment, the process of obtaining values for the positive factors and the negative factors is referred to as ‘voting.’” Nowhere in Barrett *et al.* is it disclosed that the inference system can be ***trained by the log selection of previously viewed information***. Thus, Barrett *et al.* fails to teach or suggest this novel feature of the claimed invention, and moreover Payton also fails to teach or suggest such feature.

Moreover, the Examiner acknowledges in the Office Action dated December 3, 2003, page 6, paragraph 4, that Barrett *et al.* fails to teach or suggest ***a database system that logs selections of previously viewed information at a local system received from an information delivery system***; and resorts to Payton to rectify the conceded deficiencies of Barrett *et al.* However, Payton does not teach or suggest the claimed features either.

Payton discloses the virtual on-demand delivery of digital information over existing digital transports systems by offloading a portion of the systems’ peak bandwidth requirements to local subscribers. The Examiner contends that Payton suggests a database system comparable to that claimed by applicants, and indicates that support for this contention may be found at col. 2, line 67 - col. 3, lines 1-2, and col. 5, lines 6-20. Col. 2, line 67 – col. 3, lines 1-2, states: “Each subscriber has a local server that downloads recommended and specifically requested items and *stores* them in a local storage device.” *Id.* (emphasis added). Further, col. 5, lines 6-20, states:

A subscriber data base *stores* a subscriber profile for each of the subscribers. The subscriber profile preferably includes a rating vector in which the subscriber has rated each of the items he or she has previously requested. The subscriber profile may also include demographic information about the subscriber such as the subscriber’s general likes and dislikes. A collaborative filtering system synthesizes the subscriber profiles, predicts which of the available items each subscriber may be interested in or may request, and produces a list of those recommended items for each subscriber. The list may comprise only items that a particular subscriber has never previously requested or may contain a mix of the highest recommended items and a few previously viewed items that the subscriber rated very highly, and is thus likely to request again. *Id.* (reference numerals omitted) (emphasis added).

Payton simply teaches storing information not logging information as in the claimed invention. According to Webster's New World College Dictionary (4th ed 2002) *logs* has the following connotation: **log**: ... 5. any record of progress or occurrences as on a journey, in an experiment, *etc.* . *Id.* at 844. Whereas according to the same source, *store* is to be interpreted as: **store**: 5. *Comput.* to put or keep (information) on a disk or tape, *etc.* *Id.* at 1413. It is obvious therefore that Payton, rather than ***logging selections of previously viewed information*** in a database system, *stores* recommended and specifically requested items on *the local server*, ***not in a database system***. Payton *stores* subscriber profiles in a subscriber data base, rather than ***logging selections of previously viewed information in a database system*** let alone employing such logged information in connection with ***training an inference system with log selections of previously viewed information and so as to provide for automated assignment of values to selections in a recommendation list based on the previously viewed information*** as in applicants' claimed invention. It is readily apparent from the foregoing comments that the cited references fail to teach or suggest the limitations of independent claim 1, and claims that depend therefrom - reversal of this rejection is respectfully requested.

ii. ***Barrett et al. and Payton alone or in combination fail to teach or suggest all limitations set forth in independent claim 14.***

Independent claim 14 recites ***a cache loading system that receives a list of selections from a program delivery system and stores program selection information corresponding to the list of selections in a local memory system; and a utility system that monitors program selection information in the local memory system and communicates value information to the cache loading system for removing information residing in the local memory system in exchange for information having a higher value received by the program delivery system.*** The cache loading system receives inferences ranked by preference value from an inference system, and/or direct instructions to record specific titles from a filtering system *via* a user interface. Once the cache loading system receives these inferences and/or instructions, the cache loading system requests the appropriate program information from a remote program source and stores this

information in a memory system based upon the dictates set forth by the utility system. The utility system utilizes a cache retention policy to monitor program selection information in the local memory system and communicates value information to the cache loading system for removing information residing in the local memory system in exchange for information having a higher relative value received from the program delivery system. Thus, the claimed invention provides, through utilization of the cache loading system and the utility system, for storing entire program content that is requested.

The Examiner acknowledges that Barrett *et al.* fails to teach or suggest any of the limitations set forth in the subject claims, and thus resorts to Payton to sustain the rejection of independent claim 14.

Applicants' representative submits that Payton fails to teach or suggest each and every limitation set forth in the subject claim. The Examiner asserts that Payton discloses a cache loading system that receives a list of selections from a program delivery system and stores program selection information corresponding to the list of selections in a local memory system, at col. 1, lines 9-14, which states: "The invention relates to the broadcasting of digital information to local subscribers and more specifically to a delivery system that offloads a substantial portion of the system's bandwidth requirement by intelligently caching data at the site of the local subscribers to provide a virtual on demand delivery system." Nowhere in the passage indicated by the Examiner is it taught or suggested that the cache loading system receive a list of selections from a program delivery system and stores program selection information corresponding to the list of selections in a local memory system. All that Payton appears to do is indiscriminately, without reference to any selection list, either from a program delivery system or resident in the local memory system, offload a substantial portion of the system's bandwidth requirement by intelligently caching data at the site of the local subscribers. There is no selectivity inherent in Payton based upon selection lists generated by the program delivery system and the list of selections resident on the local memory system, to which correspondence must be attained prior to storing those program selections from the program delivery system into the local memory. Thus, Payton fails to teach or suggest this novel aspect of the claimed invention.

Further, Payton fails to disclose the utility system elucidated in the subject claim, which recites in part *a utility system that monitors program selection information in the local memory system and communicates value information to the cache loading system for removing information residing in the local memory system in exchange for information having a higher value received by the program delivery system*. The Examiner asserts that Payton discloses these limitations at col. 5, lines 21-45. The indicated passage provides:

A scheduling processor merges the lists of recommended items to prioritize the items from the most to least frequently recommended and place identifiers for these items in a refresh queue for broadcast over the digital transport system. When the recommended items reach the top of the refresh queue, they are retrieved from the repository and are broadcast to the local users, preferably during off-peak viewing hours so that all of the system's bandwidth is available to service on-demand requests during on-peak hours. In response to a subscriber's on-demand request that cannot be served by that subscriber's local server, the scheduling processor merges requests for that item and places it in an on-demand queue. Items broadcast in response to subscriber's requests take priority over the broadcast of the recommended items. As a result, the subscribers' on-demand requests are served either from their local server or from the central distribution server virtually on-demand. The subscribers encounter only small delays so that the system appears transparent. If the system becomes loaded, the scheduling processor limits the number of items, in addition to those stored on the subscribers' local servers, that are available to the subscribers. This has the effect of reducing the number of on-demand requests made to the central distribution server. *Id.* (reference numeral omitted).

As is apparent from this cited section, Payton fails to *monitor program selection information in the local memory* and consequently Payton is incapable of communicating *value information to the cache loading system for removing information residing in the local memory in exchange for information having a higher value received from the program delivery system*. Thus, it is submitted Payton does not teach or suggest the exemplary features of the invention as claimed. Accordingly, since neither Barrett *et al.* nor Payton, either alone or in combination, teach or suggest each and

every limitation embodied in the subject claims, withdrawal of this rejection with respect to independent claim 14, and associated dependent claims, is respectfully requested.

iii. *Barrett et al. and Payton alone or in combination fail to teach or suggest all limitations as set forth in independent claim 32.*

Independent claim 32 recites a multimedia system adapted to locally store information received from a program delivery system for viewing at a local system. The multimedia system as disclosed in independent claim 32 comprises three components: a memory loading system, a storage system adapted to store a multimedia program for uninterrupted viewing, and a viewing system to retrieve the multimedia program for local viewing.

The Examiner asserts in the Office Action dated December 3, 2003, page 12, that “Barrett teaches a multimedia system adapted to store locally information received from a program delivery system for viewing at a local system.” Applicants’ representative avers to the contrary. Barrett *et al.* does not disclose *a multimedia system adapted to store locally information received from a program, delivery system for viewing at a local system*, as is recited in independent claim 32, but rather Barrett *et al.* discloses “a method and apparatus for television program selection that monitors the viewing preferences of a viewer to create a dynamic viewer profile that is used to rate available programs.” See Abstract, lines 1-4. Thus, Barrett *et al.* fails to teach or suggest a multimedia system adapted to locally store information received from a program delivery system, and further Payton also fails to teach or suggest this novel feature of the invention as claimed.

The Examiner next contends that Barrett *et al.* discloses at col. 11, lines 44-53, “multimedia program is being viewed until the entire multimedia program has been downloaded.” Col. 11, lines 44-53, states:

Receivers ... are receivers each preferably capable of receiving channels available to a viewer. For example, receivers may comprise receiver portions of video cassette recorders, satellite receivers, tuner sections of television receivers, etc. Receivers preferably have audio and video outputs and control interfaces that allow controller to control channels to which each of receivers are

tuned. By having two receivers, two channels may be simultaneously displayed on television monitor. (reference numerals omitted).

As is evident from the foregoing passage, Barrett *et al.* does not teach or suggest multimedia programs being viewed until the entire multimedia program has been downloaded, but rather Barrett *et al.* discloses a receiving means for simultaneously displaying two channels on a television monitor, without provision for viewing the entire multimedia program until it has been downloaded. Thus, Barrett *et al.*'s disclosure is clearly distinguishable from applicants' claimed invention.

Further as the Examiner concedes, Barrett *et al.* fails to teach or suggest the entirety of the subject claim and as a consequence reliance is placed upon Payton to rectify those aspects of the subject invention that Barrett *et al.* fails to teach.

The Examiner asserts that Payton teaches at col. 5, lines 22-45, *a local system having a memory loading system operable to determine a portion of a multimedia program, downloadable from a remote source to the local system, to store locally based on a local viewing rate and a remote transmission rate of the multimedia program.* Payton in the indicated passage however, does not teach or suggest ***a local system having a memory loading system operable to determine a portion of a multimedia program***, but rather discloses *a remote system* that determines whether or not to download recommended items or on-demand items in their entirety. Further, nowhere in Payton is it taught or suggested that the local system bases whether or not to store portions of the multimedia program ***on a local viewing rate***, e.g., how quickly the multimedia program is being viewed, and ***the remote transmission rate of the multimedia program***. Thus, Payton fails to teach or suggest this limitation of the subject claim.

The Examiner then contends that Payton teaches at col. 5, lines 37-43 and col. 6, line 59-col. 7, line 12, *a viewing system operable to retrieve the multimedia program from the storage system for viewing, wherein a remaining portion of the multimedia program is downloaded to the storage system.* Col. 5, lines 37-43 discloses:

As a result, the subscribers' on-demand requests are served either from their local server or from the central distribution server

virtually on-demand. The subscribers encounter only small delays so that the system appears transparent. If the system becomes loaded, the scheduling processor limits the number of items, in addition to those stored on the subscribers' local servers, that are available to the subscribers.

And col. 6, line 59-col.7, line 12, states:

FIGS. 3a, 3b and 3c are flowcharts illustrating the off-peak scheduling, on-demand scheduling, and continuous operation, respectively, of the delivery-system, and particularly the scheduling processor ... to transmit items to the subscribers. As shown in FIG 3a, to refresh the subscribers' local stored digital items, the scheduling processor periodically receives the updated list of recommended items for each subscriber from the collaborative filter. ... the scheduling processor transmits the changes in the list to the subscribers, preferably over the high bandwidth digital transport system. The scheduling processor merges the new additions to the list into a refresh queue and prioritizes the items so that the items recommended for the largest number of subscribers are placed at the front of the queue. Transmission of items on the refresh queue is described in FIG. 3c. Off-peak prediction and refresh is suitably preformed once a day. This is a short enough period to adequately serve the subscribers and a long enough period to download all of the recommended items without loading the transport system.

As is evident, Payton fails to provide *a viewing system for viewing* a retrieved multimedia program wherein a remaining portion of the multimedia program is downloaded to the storage system, but rather provides a scheduling processor that determines the appropriate time in which to download program content. Nowhere in Payton is *a viewing system operable to retrieve the multimedia program from the storage system for viewing, wherein a remaining portion of the multimedia program is downloaded to the storage system*, taught or suggested. Thus, it is submitted that neither Barrett *et al.* nor Payton, either alone or in combination, teach or suggest all the limitations set forth in the subject claims. Accordingly, reversal of this rejection with respect to independent claim 32, and associated dependent claims, is respectfully requested.

B. Rejection of Claims 37-56 Under 35 U.S.C. §103(a)

Claims 37-56 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Barrett *et al.* in view of Macrae *et al.* (US 6,233,734). Reversal of this rejection is respectfully requested for at least the following reasons.

i. *Barrett et al. and Macrae et al. alone or in combination fail to teach or suggest all the limitations set forth in independent claims 37 and 47.*

Independent claims 37 and 47 recite similar claim limitations, namely: *assigning a value to each of the available selections; storing information relating to a corresponding selection in the local storage system for the available selections based on value of the selection until the limits of the local storage system is obtained; and removing information from the storage medium as its value causes it to fall outside the limits of the storage medium.*

The Examiner contends that col. 5, lines 16-29 of Barrett *et al.* discloses *assigning a value to each of the available selections*. Barrett *et al.* however states at col. 5, line 17 "... the process of *obtaining* values ...". According to Webster's New World College Dictionary (4th ed 2002), obtain is defined as "1. to get possession of, esp. by some effort; procure." *Id.* at 996. Assign on the other hand is defined as "1. to set apart or mark for a specific purpose; designate." *Id.* at 85. Thus, Barrett *et al.* rather than internally *assigning*, i.e. designating, *values to each of the available selections*, obtains values from some external source, i.e. through a voting process. Thus, it is apparent that Barrett *et al.* fails to teach or suggest this particular novel feature, and furthermore, Macrae *et al.* is deficient in this aspect as well.

The Examiner further contends that col. 5, lines 57-65 discloses *storing information relating to a corresponding selection in the local storage system for the available selections based on value of the selection until the limits of the local storage system is obtained*. The indicated passage however states:

In one embodiment, the template is stored during manufacture in non-volatile local storage of a television receiving apparatus implementing the invention, and retrieved from local storage during the initial viewer profile creation process. In one embodiment, the template is downloaded via telephone or internet link from a central databank. In one or more embodiments, the viewer profile template also includes a list of topics from some or all listed shows.

Nowhere in the foregoing passage is mention made of *storing information* based on the *value of the selection*. In particular, Barrett *et al.* fails to utilize the value of the selection, which is based on the probability – calculated through collaborative filtering methods - that a user will view a particular selection, to determine whether or not to store information. Clearly then, Barrett *et al.* is deficient in failing to teach or suggest this novel aspect of the claimed invention, and further Macrae *et al.* also fails to teach or suggest this feature.

In addition, the Examiner acknowledges that Barrett *et al.* fails to disclose *removing information from the storage medium as its value causes it to fall outside the limits of the storage medium*. In this regard, the Examiner seeks to rely on Macrae *et al.* to make up for this particular deficiency, indicating that Macrae *et al.* discloses this particular feature at col. 12, lines 45-50. Applicants' representative asserts that Macrae *et al.* also fails to teach or suggest this unique feature of the claimed invention. It is submitted that the indicated passage fails disclose *removing information from the storage medium based on the diminution of a value associated with the information*. All that Macrae *et al.* appears to disclose is that old items are deleted to recover database storage space.

In view of at least the foregoing, it is submitted that Barrett *et al.* and Macrae *et al.*, either alone or in combination, fail to teach or suggest each and every limitation set forth in independent claims 37 and 47, and associated dependent claims. Accordingly, withdrawal of this rejection is respectfully requested.

- ii. *Barrett et al. and Macrae et al. alone or in combination fail to teach or suggest all limitations set forth in independent claim 53.*

Independent claim 53 recites *a utility system operable to monitor program selection information in the local memory system and communicate value information to the cache loading system wherein high values are assigned to live show selections currently in progress, which are quickly decayed after the show is no longer live wherein live shows residing in the local memory having lower values are aged out in exchange for live shows having a higher value received by the program delivery system.* Neither Barrett *et al.* nor Macrae *et al.* teach or suggest a exemplary utility system wherein high values are assigned to live show selections that are currently in progress, and then for the rapid decay or diminishment of these values shortly after the selection is no longer live, such that previously live shows are ultimately aged out in exchange for subsequent live shows that have a higher value when received by the program delivery system. In fact, the Examiner acknowledges that Barrett *et al.* does not teach or suggest this aspect of the claimed invention, and it is submitted that nowhere in Macrae *et al.* is such facility taught or suggested.

The Examiner asserts that Macrae *et al.* discloses a decaying facility comparable to that taught by the claimed invention at col. 12, lines 25-43, which states in relevant part:

...to allow the channel ordering to be based on the user's viewing habits, the set-top box maintains a running record of the amount of time the user views the various channels over a selected period of time, and orders the channels based on a viewing time rating that is a function of actual viewing time over a current viewing period, for example, the previous day or week, and further based on a decaying function of viewing time for viewing periods before the current viewing period. See col. 12, lines 25-33.

As is quite evident from the preceding passage, Macrae *et al.*'s decaying system does not rely upon whether or not a show is live, but rather is based primarily on the length of time that a user dwells on a particular channel and to a certain extent on the

length of time that a user has previously dwelt on a particular channel. No account is taken of whether or not *a show is live* in assessing the decay rate. Further, the decaying system as taught by the claimed invention, considers not only issues of whether or not a particular show is live, but in addition, ascertains other contextual properties of a particular show, and thus is capable of assigning different decay rates to different kinds of program content as a function of the time not viewed since capture. Consequently, Macrae *et al.* does not teach or suggest applicants' decaying facility, and accordingly, the combination of Barrett *et al.* and Macrae *et al.* fails to teach or suggest all limitations recited in independent claim 53 and its associated dependent claims. Thus, reversal of this rejection is respectfully requested.

C. Rejection of Claims 10-13, 17-18, 20-21, 29-31 and 36 Under 35 U.S.C. §103(a)

Claims 10-13, 17-18, 20-21, 29-31 and 36 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Barrett *et al.* in view of Payton and further in view of Macrae *et al.* It is respectfully requested that this rejection be withdrawn for at least the following reasons.

- i. Barrett et al., Payton and Macrae et al. alone or in combination fail to teach or suggest each and every limitation set forth in the subject claims.*

Claims 10-13, 17-18, 20-21, 29-31 and 36 depend from independent claims 1, 14 and 32, and as has been discussed *supra*, Payton and Macrae *et al.* do not make up for the deficiencies presented by Barrett *et al.* with respect to independent claims 1, 14, and 32. Accordingly, withdrawal of this rejection is respectfully requested.

D. Rejection of Claims 57-58 and 61 Under 35 U.S.C. §103(a)

Claims 57-58 and 61 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Macrae *et al.* in view of Barrett *et al.* in view of Payton and further in view of Macrae *et al.* Withdrawal of this rejection is respectfully requested for at least the following reasons.

- i. ***Macrae et al., Barrett et al., Payton and Macrae et al., alone or in combination, fail to teach or suggest all the limitations set forth in independent claim 57.***

Independent claim 57 recites ***an inference component that employs the log information in application of a utility-based analysis in connection with selectively storing to and/or deleting items from a local storage space.*** Applicants' claimed invention clearly utilizes a utility-based knapsack analysis to provide inferences to selectively store and/or delete items from local storage. The utility-based knapsack analysis is based on an expected value density of content, which is defined as the ratio of the value assigned to a particular item of media content and the memory cost of storing that content based on the size of the content. The utility-based knapsack analysis is continuously and automatically performed upon the log information relating to the historical access of items of media content. Alone or in combination, Macrae *et al.*, Barrett *et al.* and Payton, do not teach or suggest this aspect of the claimed invention.

The Examiner recognizes that Macrae *et al.* is silent regarding an inference component employing log information in applying a utility-based analysis in connection with selectively storing to and/or deleting items from a local storage space, and thus attempts to use Barrett *et al.* to make up for the deficiencies of Macrae *et al.* It is submitted however that Barrett *et al.* is also deficient in failing to teach or suggest the inference component as set forth in the subject claim. The Examiner claims that substantiation for his assertion may be found at col. 4, lines 1-4 of Barrett *et al.* However, col. 4, lines 1-4 state: "The viewer profiles may, for example, be stored in a viewer profile database. The collaborative information is used to augment the viewer profile by inferring program choices based on similarities with other users." Though Barrett *et al.* makes mention of inferring program choices, the inferences made in Barrett *et al.* are not based on an utility-based analysis of the log information so as to selectively store to and/or delete items form a local storage space. Thus, it is submitted that neither Macrae *et al.* nor Barrett *et al.* teach or suggest this exemplary aspect of independent claim 57. Accordingly, in view of at least the foregoing, it is respectfully requested that this rejection be withdrawn with respect to independent claim 57 and those claims that depend therefrom.

E. Rejection of Claims 59-60 and 62-65 Under 35 U.S.C. §103(a)

Claims 59-60 and 62-65 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Macrae *et al.* in view of Barrett *et al.* and further in view of Payton. This rejection should be withdrawn for at least the following reasons.

- i. Macrae et al., Barrett et al., and Payton, alone or in combination, fail to make obvious applicants' invention as set forth in the subject claims.*

Claims 59-60 and 62-65 depend from independent claim 57, and Barrett *et al.* and Payton do not make up for the deficiencies inherent in Macrae *et al.* with respect to independent claim 57, and therefore do not make obvious applicants claimed invention.

F. Rejection of Claim 66 Under 35 U.S.C. §103(a)

Claim 66 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Macrae *et al.* in view of Barrett *et al.* in view of Payton and further in view of Macrae *et al.* Reversal of this rejection is respectfully requested for at least the following reasons.

- i. Macrae et al., Barrett et al. and Payton, alone or in combination, fail to make obvious applicants' invention as set forth in the subject claim.*

Independent claim 66 recites a *means for applying the values in a value density-based utility analysis in connection with at least one of: replacement, retention, and compression of the subset of items to a memory*. The invention as claimed relates to a means for utilizing calculated value densities within a utility-based knapsack analysis in order to replace, retain or compress a subset of items to facilitate optimal memory utilization. Macrae *et al.*, Barrett *et al.* and Payton, are silent regarding this novel feature of the invention as claimed.

The Examiner concedes that Payton does not teach or suggest a means for applying the values in a value density-based utility analysis; and therefore the Examiner attempts to utilize Macrae *et al.* to make up for the deficiencies rendered by Payton. However, as has been argued in context of independent claim 57, applicants' representative asserts that Macrae *et al.* fails to provide the substantiation that the Examiner seeks to rely upon to form a reasonable basis for his rejection. Nowhere in Macrae *et al.* is a means for applying the values in a value density-based utility analysis in connection with at least one of: replacement, retention, and compression of the subset of items to a memory disclosed. Accordingly, in view of the failure of any of the indicated documents to teach or suggest the novel limitations of the subject claim, withdrawal of the rejection is respectfully requested.

IX. Conclusion

For at least the above reasons, the claims currently under consideration are believed to be patentable over the cited references. Accordingly, it is respectfully requested that the rejections of claims 1-66 be reversed.

If any additional fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063.

Respectfully submitted,
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JUL 29 2004

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X. Appendix of Claims (37 C.F.R. §1.192(c)(9))

1. A system for storing information locally that is received from an information delivery system for viewing at a local system, comprising;

a database system that logs selections of previously viewed information at a local system received from an information delivery system;

an inference system trained by the log selections of previously viewed information and that assigns values to selections in a recommendation list based on the previously viewed information; and

a local storage system that stores selection information corresponding to the assigned values of the selections.

2. The system of claim 1, the inference system employs collaborative filtering techniques on a temporal history of the previously viewed information to assign values to selections in the recommendation list from a higher probability to a lower probability that a user of the system would prefer to view information corresponding to an available selection.

3. The system of claim 1, the previously viewed information is time stamped by event type and the inference system is based on a single collaborative filtering model being trained according to time intervals that has been viewed.

4. The system of claim 1, the inference system being based on a single collaborative filtering model being trained according to time intervals that has been viewed.

5. The system of claim 1, the viewed information is time stamped by event occurrence and the inference system is based on a single collaborative filtering model trained according to time intervals that the information has been viewed.

6. The system of claim 1, the inference system receives further attributes of other systems and utilizes these attributes during training of the inference system.

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7. The system of claim 1, the inference system receives attributes of other systems and utilizes these attributes during training of the inference system.
 8. The system of claim 1, the local storage system assigns sorting values to the selections based on a set of the selection.
 9. The system of claim 1, the local storage system dynamically adjusts the value of the selections based on a set of cache retention policies.
 10. The system of claim 9, the local storage system receives new selections with assigned values and dynamically adjusts location of the stored information and new information based on the new selections in the local storage system, wherein information is aged out of the local storage system based on an expected value density of each selection.
 11. The system of claim 10, wherein aged out information is reduced in size and quality by compressing the information and stored on the local storage system based on the likelihood that the user will view the information prior to removing the information from the local storage system.
 12. The system of claim 10, the expected value density of a selection is determined based on the assigned value of the selection divided by the size of the selection.
 13. The system of claim 12, wherein selections are grouped by class types with different cache retention policies for aging the assigned values of selections within different class types.

14. A multimedia system that stores information locally received from a program delivery system for viewing at a local system, comprising;

a cache loading system that receives a list of selections from a program delivery system and stores program selection information corresponding to the list of selections in a local memory system; and

a utility system that monitors program selection information in the local memory system and communicates value information to the cache loading system for removing information residing in the local memory system in exchange for information having a higher value received by the program delivery system.

15. The system of claim 14, the program selection information being television content.

16. The system of claim 15, the local memory system comprising a first portion to define user defined selections to be stored, a second portion to define live show selection to be stored and a third portion to define general selections to be stored.

17. The system of claim 14, the local storage system that receives new selections with assigned values, the utility system dynamically adjusts the location of the stored information and new information based on the new selections in the local storage system, wherein information is aged out of the local storage system based on an expected value density of each selection.

18. The system of claim 17, the expected value density of a selection is determined based on the assigned value of the selection divided by the size of the selection.

19. The system of claim 14, the utility system dynamically adjusts the assigned values based on a cache retention policy.

20. The system of claim 14, wherein selections are grouped by class types with different cache retention policies for aging the assigned values of selections within different class types.

21. The system of claim 20, wherein the cache retention policies of each class type is initially defined based on a default time-dependent decay function, the time-dependent decay function being continuously refined based on the likelihood that a user will view a program based on the amount of time that has passed since the program has been recorded and not yet viewed.

22. The system of claim 14, the utility system comprising a time dependent utility model that dynamically adjusts the assigned values based on the time that the selection resides in the local memory system.

23. The system of claim 14, further comprising an inference system adapted to receive a reviewed program list from the program delivery system, provide a recommendation list and dynamically assign values to selections in the recommendation list based on previously viewed programs, wherein the cache loading system stores the program selection information corresponding to the assigned values of the selections in the local storage system.

24. The system of claim 23, the inference system employing collaborative filtering techniques on a temporal history of previously viewed programs and the selectable program list to dynamically assign values to selections in a recommended program list from a higher probability to a lower probability that a user of the system would prefer to view information corresponding to an available selection.

25. The system of claim 24, the viewed programs being time stamped by event type and the inference system being based on a single collaborative filtering model adapted to be trained according to time intervals that the information has been viewed.

26. The system of claim 24, the inference system being based on a plurality of separate collaborative filtering models, each collaborative filtering model being trained with the information from a particular time interval of temporal history that has been viewed.

27. The system of claim 24, the viewed programs being time stamped by event occurrence and the inference system being based on a single collaborative filtering model adapted to be trained according to time intervals that the information has been viewed.

28. The system of claim 24, the inference system being further adapted to receive further attributes of at least one user of the system and utilize these attributes in assigning values to selections in the selectable program list.

29. The system of claim 14, the cache loading system being further adapted to record live shows at any given time period for N number of shows employing N number of tuners, wherein the shows are selected based on the temporal history of previously viewed programs within a time interval covering the any given time period.

30. The system of claim 14, the multimedia system residing on a television set top box.

31. The system of claim 14, the information system residing on a remote server communicatively coupled to at least one set top box, wherein a recommendation list and information corresponding to programs in the recommendation list are generated by the server and transmitted to the set top box.

32. A multimedia system adapted to store locally information received from a program delivery system for viewing at a local system, comprising;

a local system having a memory loading system operable to determine a portion of a multimedia program, downloadable from a remote source to the local system, to store locally based on a local viewing rate and a remote transmission rate of the multimedia program;

a storage system adapted to store a portion of the multimedia program necessary for uninterrupted viewing of the multimedia program; and

a viewing system operable to retrieve the multimedia program from the storage system for viewing, wherein a remaining portion of the multimedia program is downloaded to the storage system while the multimedia program is being viewed until the entire multimedia program has been downloaded.

33. The system of claim 32, the storage information being adapted to store portions of a plurality of downloadable selections based on a probability that a system user would like to view a selection.

34. The system of claim 32, further comprising an inference system adapted to determine the portions of downloadable selections to store in the storage system based on the temporal history of previously viewed programs of the system.

35. The system of claim 32, the inference system employing collaborative filtering techniques on a temporal history of previously viewed programs and a selectable downloadable program list to dynamically assign values to selections in the selectable program list from a higher probability to a lower probability that a user of the system would prefer to view information corresponding to available selections.

36. The system of claim 35, further comprising a utility system operable to monitor program selection information in the storage system and communicate aging information to the memory loading system for aging out older program information residing in the storage system in exchange for newer information.

37. A method for determining user preferred content to be stored in a local storage system having definite limits, the user preferred content being received from an information delivery system for viewing at a local system, comprising;

receiving a list of available selections;

assigning a value to each of the available selections;

storing information relating to a corresponding selection in the local storage system for the available selections based on value of the selection until the limits of the local storage system is obtained;

dynamically adjusting the values of the available selections based on at least one cache retention policy; and

removing information from the storage medium as its value causes it to fall outside the limits of the storage medium.

38. The method of claim 37, the step of assigning values to available selections comprising employing collaborative filtering techniques on a temporal history of previously viewed information and the list of available selections to determine a higher probability to a lower probability that a system user would prefer to view information corresponding to an available selection.

39. The method of claim 38, the step of assigning values to available selections further comprising considering attributes of at least one system user and utilizing these attributes in assigning values to selections in the available selection list.

40. The method of claim 38, the step of assigning values to available selections further comprising considering attributes of other systems and utilizing these attributes in providing global values to a list of available selections to a cluster of systems based on the temporal viewing history of the systems of the cluster.

41. The method of claim 37, further comprising a step of determining an expected value density of each selection by dividing the value of the selection by the size of the selection for each selection stored in the local storage system.

42. The method of claim 37, the at least one cache retention policy being a value aging rule set such that the assigned values are dynamically adjusted based on the time that the selection resides in the local storage system.

43. The method of claim 42, further comprising receiving new selections with assigned values and dynamically adjusting the location of the stored information and new information in the local storage system wherein information is aged out of the local storage system having lower values that falls outside the limits of the local storage system.

44. The method of claim 42, the at least one cache retention policy comprising a plurality of cache retention policies grouped by class types with different cache retention policies for aging the assigned values of selections within different class types.

45. The method of claim 37, the local storage system comprising a first portion for storing user defined selections to be stored, a second portion for defining live show selection to be stored and a third portion for defining general selections to be stored.

46. The method of claim 45, further comprising recording programs that are currently in progress at a given time period for selective viewing of at least one of the programs from a beginning of a program in the second portion.

47. A system for determining user preferred content to be stored in a local storage system having definite limits, the user preferred content being received from an information delivery system for viewing at a local system, comprising;

means for receiving a list of available selections;

means for assigning a value to each of the available selections;

means for storing information relating to a corresponding selection in the local storage system for the available selections based on the assigned value until the limits of the local storage system is obtained;

means for dynamically adjusting the values of the available selections based on a utility of the selection; and

means for removing information from the storage medium as its value causes it to fall outside the limits of the storage medium.

48. The system of claim 47, the means for assigning values to available selections being adapted to employ collaborative filtering techniques on a temporal history of previously viewed information and the list of available selections to determine a higher probability to a lower probability that a system user would prefer to view information corresponding to an available selection.

49. The system of claim 47, further comprising means for determining an expected density value of selections by dividing the value of the selection by the size of the selection for each selection stored in the local storage system.

50. The system of claim 47, the utility of the selection being based on the time that the selection resides in the local storage system.

51. The system of claim 47, the available selections being television programs and the local system being a television.

52. The system of claim 51, further comprising means for recording television programs that are currently in progress at a given time period for selective viewing of at least one of the programs from a beginning point.

53. A multimedia system adapted to store television content locally that is received from a program delivery system for viewing at a local system, comprising;

a cache loading system operable to receive a list of live show selections from a program delivery system and store the live show selections corresponding to the list of selections in a local memory system; and

a utility system operable to monitor program selection information in the local memory system and communicate value information to the cache loading system wherein high values are assigned to live show selections currently in progress, which are quickly decayed after the show is no longer live wherein live shows residing in the local memory having lower values are aged out in exchange for live shows having a higher value received by the program delivery system.

54. The system of claim 53, the cache loading system being further adapted to record live shows at any given time period for N number of shows employing N number of tuners, wherein the shows are selected based on the temporal history of previously viewed programs within a time interval.

55. The system of claim 53, the cache loading system being further adapted to record other shows that are not live with the live shows wherein the live shows are provided with higher initial values than the other shows and aged out quicker when no longer live than the other shows.

56. The system of claim 53, wherein live show selections beginning at starting standard times, starting at one of the hour and half hour, are provided with higher initial values than the other shows and aged out quicker when no longer live than the other shows, wherein the higher initial values are determined based on the likelihood that the show will be viewed by a user of the system.

57. A system that facilitates local storage space utilization, comprising:
a component that logs information relating to historical access of items; and
an inference component that employs the log information in application of a utility-based analysis in connection with selectively storing to and/or deleting items from a local storage space.
58. The system of claim 57, the inference component dynamically computes changing value densities across a subset of the items to at least one of: repack, recompress, and replace old items with new items.
59. The system of claim 57, the utility analysis comprising computing a likelihood that an item will be accessed given certain evidence.
60. The system of claim 59, the utility analysis considers decay rates per respective volatility of content relating to the subset of items.
61. The system of claim 57, the items comprise media.
62. The system of claim 57, the items comprise electronic documents.
63. The system of claim 57, the utility analysis comprising employment of parametric functions to assess value of a respective item.
64. The system of claim 57, further comprising a model of the probability an item will be accessed.
65. The system of claim 64, the model is a statistical model.

66. A system that facilitates memory utilization, comprising:

- means for storing logging information relating to historical access of items; and
- means for appointing respective values to a subset of the items based on access thereof; and
- means for applying the values in a value density-based utility analysis in connection with at least one of: replacement, retention, and compression of the subset of items to a memory.